

Correlation of Lipid Profile and Serum Uric Acid Level in Postmenopausal Women Attending OPD of A Hospital of Haryana, India

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Abstract: Menopause also known as the climacteric is although not a disease, is associated with annoying physiological changes, and varied symptoms such as hot flushes, night sweat, urinary and genital changes, dyspareunia, insomnia, and many psychological dysfunction such as anxiety, depression lack of concentration, and decreased self-esteem. Menopause in women is a physiologic process that occurs around 45-55 years. Elevation in uric acid and deranged lipid profile are associated with increased stroke risk. Correlation of lipid profile and serum uric acid level in postmenopausal women. Fifty healthy postmenopausal women were included in study, five ml. of venous blood was taken in red vacutainer and serum was separated. Lipid profile and Uric acid was estimated by enzymatic method in auto analyser. Exclusion Criterion washistory of cardiovascular diseases, history of rheumatoid arthritis, history of radiotherapy, history of liver and renal disease, history of endocrinal disease, women those on antioxidant and vitamin supplements and postmenopausal women on HRT. It was found that uric acid has positive correlation with TG, VLDL, and total cholesterol while having negative correlation with HDL. Decreased HDL level and increased other lipid profile parameters e.g. TG, Cholesterol, VLDL, LDL in postmenopausal women, and increased serum uric acid level in postmenopausal women than premenopausal women. Postmenopausal women are more prone for gout and cardiovascular disease.

Keywords: Serum uric acid, lipid profile, post-menopausal.

INTRODUCTION

Menopause also known as the climacteric is although not a disease, menopause, is an unavoidable physiological age dependent phenomenon, though age of entering in this phase of life and symptoms are different for every women. Menopause occurs around 45-55 years [1].

The stages of reproductive aging workshop (STRAW) staging system are widely considered the gold standard for characterizing reproductive aging through menopause. STRAW divided the adult female

life into three broad phases: reproductive, the menopausal transition and post menopause. These three phases included a total of seven stages centered on the final menstrual period (stage 0) [2].

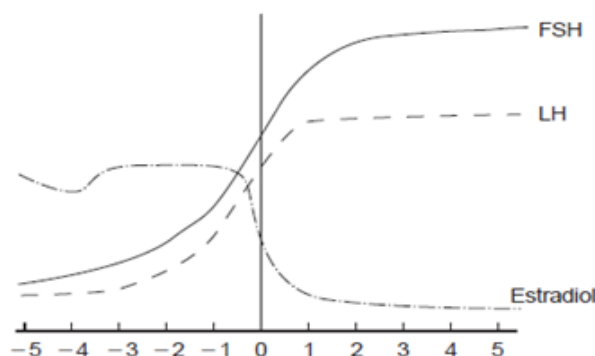


Fig-1: Phases of reproductive life of a woman

During menopausal period there is an abnormal atherogenic lipid profile characterized by increased low density lipoprotein cholesterol (LDL-C), triglycerides and small dense LDL particles with reduced high density lipoprotein cholesterol (HDL-C), so that the risk of cardiovascular disease increases exponentially for women as they enter menopause and estrogen levels decline. Estrogen has uricosuric action, so gout is rare in younger female in comparison of postmenopausal age group[3,4]. Dyslipidemia is a major cause of cardiovascular disease in postmenopausal women and uric acid is also increased in postmenopausal women so we conduct this study to evaluate if any correlation between these parameters[5].

Uric acid is a final enzymatic product in the degradation of purine nucleosides and free bases in humans. Uric acid is 2,6,8 trihydroxypurine, The pool of urate in the body is about 7.2 mmol (1.2g) of which, there is a turnover of about half daily, i.e. about 3.6 mmol (0.6g) is forms daily and about the same amount also loses per day. Some studies hypothesize that uric acid is increased as a result of oxidative stress and menopausal status is well known oxidative stress condition[6]. Uric acid prevents the degradation of extracellular superoxide dismutase that catalyses the formation of superoxide anion to hydrogen peroxide. The removal of superoxide anion by superoxide dismutase 3 prevents the reaction and inactivation of the important endothelial vasodilator, nitric oxide. Superoxide dismutase thus helps to maintain nitric oxide levels and endothelial function. Normally, superoxide dismutase (SOD) is inactivated in the

presence of hydrogen peroxide, suggesting feedback inhibition of the enzyme. Uric acid blocks superoxide dismutase inactivation by hydrogen peroxide by regenerating SOD with the production of a urate radical [7].

MATERIALS AND METHODS

This was an observational cross sectional study carried out at OPD of Gynecology department and department of Medical Biochemistry of PGIMS, Rohatak in 2016. After taking verbal and written consent along with applying exclusion and inclusion criterias, 50 healthy postmenopausal women were included in study, five mL of venous blood was taken in red vacutainer and serum was separated. LDL and VLDL were calculated by Friedewald equation while HDL, total cholesterol, triglyceride levels and uric acid was estimated by enzymatic method in auto analyser (Randox Suzuka). Exclusion Criterion were history of cardiovascular diseases, history of rheumatoid arthritis, history of radiotherapy, history of liver and renal disease, history of endocrinal disease. Those on antioxidant and vitamin supplements and postmenopausal women on HRT were also excluded.

Statistical analysis is carried out by using SPSS version 21. Data were expressed as mean \pm SD. Scatter plot diagram method was used to see correlation between parameters.

RESULTS

The mean age of postmenopausal women was found ($M \pm SD = 54.04 \pm 2.40$ yrs.)

Table-1: lipid profile and uric acid in mg/dl (mean \pm SD)

S. No.	Parameter	Mean \pm SD
1	T.G. (mg/dl)	133.66 \pm 20.21
2	CHL (mg/dl)	197.00 \pm 14.06
3	HDL (mg/dl)	38.70 \pm 9.03
4	LDL (mg/dl)	131.57 \pm 16.92
5	VLDL (mg/dl)	26.73 \pm 4.04
6	Uric acid (mg/dl)	4.39 \pm 0.69

Mean value of triglycerides in postmenopausal women was found (Mean \pm SD) 133.66 \pm 20.21 mg/dl , cholesterol was found 197.00 \pm 14.06,HDL was found

38.70 \pm 9.03 mg/dl, LDL was found 131.57 \pm 16.92, VLDL was found 26.73 \pm 4.04 and serum uric acid was found 4.39 \pm 0.69 mg/dl (Table No.1)

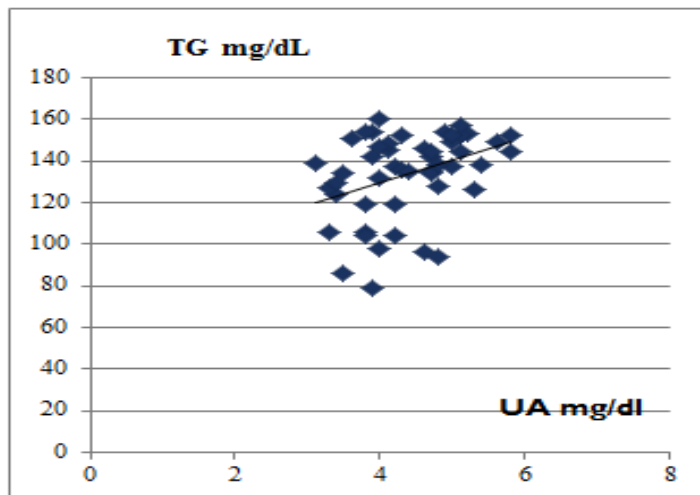


Fig-2: Positive correlation scatter plot diagram of TG & UA
Where TG= Triglyceride and UA= Uric Acid

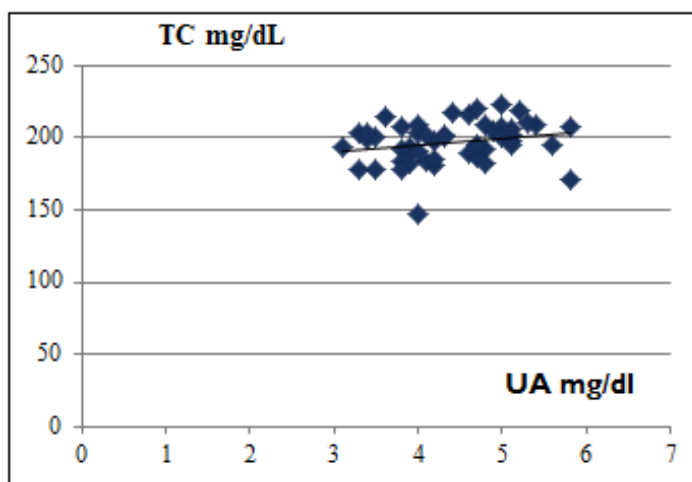


Fig-3: Positive correlation scatter plot diagram of TC & UA
Where TC= Total Cholesterol and UA= Uric Acid

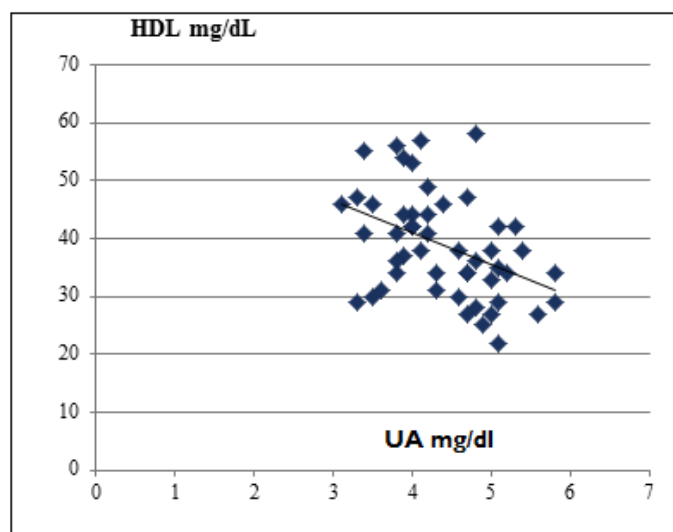


Fig-4: Negative correlation scatter plot diagram of HDL & UA
Where HDL= High Density Lipoprotein and UA= Uric Acid

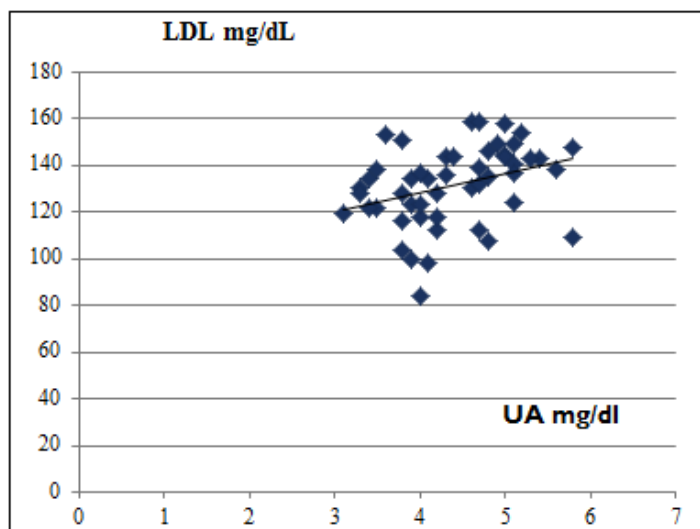


Fig-5: Positive correlation scatter plot diagram of LDL & UA
Where LDL= Low Density Lipoprotein and UA= Uric Acid

DISCUSSION

In the present study it was found that uric acid has positive correlation with TG, LDL and total cholesterol while having negative correlation with HDL. Hence oestrogen is less among postmenopausal women so that uric acid is increased and this may be explained by that higher level of triglycerides in postmenopausal women may lead to higher level of uric acid because the de novo synthesis of purine is mediated by NADPH and thus during TG synthesis there is a greater need for NADPH and further greater production of purines and uric acid[8].

This was also justified by Chen *et al.*[9] in their study that the synthesis of fatty acid in the liver is associated with the de novo synthesis of purine, thus accelerating uric acid production. The higher level of uric acid can also be explained on the basis of BMI. As age advances BMI is increased and increased BMI is associated with insulin resistance and leptin production and in further both of these reduces uric acid excretion[10].

Similarly a cross-sectional analysis conducted by Doris Stöckl *et al.* in 2012 from, data of 1530 women aged 32 to 81 years participating in the KORA F4 study, conducted between 2006 and 2008 in Southern Germany and found about high uric acid among postmenopausal age group[11]. Is also support the present study.

CONCLUSION

Decreased estrogen leads to increased uric acid level and deranged lipid profile, also estrogen has antioxidant property which is decreased in postmenopausal women, that is postmenopausal women has increased oxidative stress level, to reduce the oxidative stress uric acid has compensatory increased in postmenopausal women. So it was concluded that

increased serum uric acid level are associated with deranged lipid profile in postmenopausal women, which may further leads to cardiovascular events. So by giving antioxidants in diet and hormone replacement therapy may delays these complications in postmenopausal women. Further studies, especially longitudinal population-based studies investigating the relationship of female reproductive parameters with uric acid levels are necessary to confirm our findings.

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